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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,230	10/02/2003	Richard W. Pekala	27589/8:3	3559
3528 7590 03/01/2007 STOEL RIVES LLP 900 SW FIFTH AVENUE SUITE 2600 PORTLAND, OR 97204-1268			EXAMINER VO, HAI	
			ART UNIT	PAPER NUMBER
			1771	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/679,230

Applicant(s)

PEKALA, RICHARD W.

Examiner

Hai Vo

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 5-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 5-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

1. The 112 claim rejections are withdrawn in view of Applicant's arguments (see second paragraph at page 3 of the 12/13/2006 amendment).
2. All of the art rejections are maintained.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/52240 in view of JP 02-155161 and Larsen et al (US 3,351,495).
WO'240 teaches a battery separator comprising a polymer web comprising an ultrahigh molecular weight polyethylene (UHMWPE) having an intrinsic viscosity of at least 10 deciliters/gram with the range disclosed in the present specification (page 4, line 28, table 1). Therefore, it is the examiner's position that the UHMWPE of WO'240 would substantially provide sufficient molecular chain entanglement to impart high-strength mechanical properties to the polymer web. This is in line with *In re Spada*, 15 USPQ 2d 1655 (1990) which holds that products of identical chemical composition can not have mutually exclusive properties. The web further comprises a silica component and an antioxidant (table 1). WO'240 uses the antioxidant commercially available under the tradename IRGANOX B-215 (table 1). This is exactly the same antioxidant employed by Applicant and therefore WO'240 implicitly discloses the use of

(tetrakis[methylenen(3,5-di-tert-butyl-4-hydroxyhydrocinnamate] methane). The use of the antioxidant within the web indicates the presence of the antioxidant in the interior portion of the web. The polymer web is positioned adjacent an electrode structure to form a battery assembly into which is placed an electrolyte that is at least partially absorbed by the electrode structure (page 1, lines 1-7). WO'240 does not specifically disclose the polymer web being coated with the antioxidant material. JP'161 teaches the polymer web having been with the paraffin oil containing an antioxidant material and phosphoric acid type peroxide decomposer to keep the battery separator from oxidizing deterioration at high temperature (abstract). JP'161 teaches the polymer web being immersed into the coating material. Likewise, the entire surface of polymer web is coated with the coating material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the coating material containing an antioxidant material as shown in the JP'161 reference motivated by the desire to prevent oxidizing deterioration at high temperature.

Calculations based on upon data in table 1 of WO 98/52240 and Table 1, sample 8 of Abstract JP 02-155161.

Example No.	1		2	
Silica, g	454		454	
PE/CB concentrate (1), g	17.3	9.5	13.3	7.3
UHMWPE, g	168	168	128	128
Antioxidant (AO), g	2.9		2.2	

Lubricant, g	2.9	2.2
Processing oil, g	788	797
12% residual oil, g	94.56	95.64
Total separator mass, g	739.66	695.34
Total PE, g	177.5	135.3
20% adhered oil contng 5% AO (JP'161), g	7.4	7.0
AO/PE (includes AO in original mix and that deposited onto separator	0.058	0.068

(1) Polyblak[®] 1850V Polyethylene / carbon black concentrate (approx. 55% polyethylene, 45% carbon black, by weight), A. Schulmann Inc.

The Polyethylene / carbon black concentrate of 17.3 g corresponds to 9.5 g (17.3×0.55) Polyethylene.

WO '240 discloses the battery separator containing 12% residual oil, which sets forth 94.56 g (788×0.12) (page 8). As pointed out by Applicant, the maximum amount of the antioxidant contained in the paraffin oil is limited to 1% by weight based on the total weight of the separator (see paragraph no. 12 of the declaration). Therefore, in view of the teachings of JP'161, one skilled in the art would use 7.4 g (0.01×739.66) of the antioxidant in the coating material.

Therefore, the antioxidant present in the original mix and that deposited onto separator is $7.4 + 2.9 = 10.3$ and ratio of the antioxidant to the polyolefin is $10.3 / 177.5 = 0.058$ which is well below the 0.17 minimum of the claimed range.

As shown in Larsen et al (US 3,351,495), the antioxidant could be added to the separator in the amount up to 15% by weight of the polyethylene (column 1, lines 50-55). The ratio of antioxidant to polyethylene is recalculated in view of 15% by weight antioxidant based on the weight of the polymer:

$$\text{Example 1: } (0.15 \times 177.5 + 7.4) / 177.5 = 0.19$$

$$\text{Example 2: } (0.15 \times 135.3 + 7) / 135.3 = 0.2$$

Both of the values are within the claimed range. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an antioxidant material in combination with the polymer in an amount as disclosed in Larsen motivated by the desire to prevent oxidizing deterioration at high temperature.

5. Claims 1, 2, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takita et al (US 5,051,183) in view of Whear et al (US 6,120,939) and JP 02-155161 and Larsen et al (US 3,351,495) as evidenced by WO 97/45365. Takita teaches a battery separator comprising a polymer web comprising an ultrahigh molecular weight polyethylene (UHMWPE) that provides sufficient molecular chain entanglement to impart high-strength mechanical properties to the polymer web (column 1, line 12, and column 4, lines 60-65). Takita discloses the web further comprising (tetrakis[methylenen(3,5-di-tert-butyl-4-hydroxyhydrocinnamate)] methane) as an antioxidant (example 1). The use of the antioxidant within the web indicates the presence of the antioxidant in the interior portion of the web. Takita does not specifically disclose the polymer web being

coated with the antioxidant material. JP'161 teaches the polymer web for use in battery separators having been with the paraffin oil containing an antioxidant material and phosphoric acid type peroxide decomposer to keep the battery separator from oxidizing deterioration at high temperature (abstract). JP'161 teaches the polymer web being immersed into the coating material. Likewise, the entire surface of polymer web is coated with the coating material. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the coating material containing an antioxidant material as shown in the JP'161 reference motivated by the desire to prevent oxidizing deterioration at high temperature.

Takita does not specifically disclose the use of a silica within the polymer web. Whear, however, teaches a battery separator comprising a polymer web comprising silica particles commercially available under the tradename WB-10 lower electrical resistivities of the battery separator (column 2, lines 40-42). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use silica particle in the polymer web motivated by the desire to lower electrical resistivities of the battery separator. The motivational statement is taken from WO 97/45365.

Takita discloses the antioxidant present in an amount of 0.375 parts by weight based on 100 parts by weight of polyethylene solution (example 1). As pointed out by Applicant, the maximum amount of the antioxidant contained in the paraffin oil is limited to 1% by weight based on the total weight of the

separator (see paragraph no. 12 of the declaration). In view of the teachings of JP'161, one skilled in the art would use 1 part by weight based on 100 parts by weight of the separator for the coating material. The antioxidant present in both original mix and the coating is 1.375 parts by weight. The separator contains 10 parts by weight of polypropylene which gives a ratio of antioxidant to polyethylene of $1.375/10=0.14$. As shown in Larsen et al (US 3,351,49) the antioxidant could be added to the separator in the amount up to 15% by weight of the polyethylene (column 1, lines 50-55).

The ratio of antioxidant to polyethylene is recalculated in view of 15% by weight antioxidant based on the weight of the polyethylene: $(1+1.5)/10=0.25$, which is within the claimed range. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use an antioxidant material in combination with the polymer in an amount as disclosed in Larsen motivated by the desire to prevent oxidizing deterioration at high temperature.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takita et al (US 5,051,183) in view of Whear et al (US 6,120,939) and JP 02-155161 and Larsen et al (US 3,351,495), as evidenced by WO 97/45365, as applied to claim 1 above, further in view of WO 98/52240. Takita does not specifically disclose the polymer web positioned adjacent an electrode structure to form a battery assembly into which is placed an electrolyte that is at least partially absorbed by the electrode structure. WO'240 supplied the missing feature. WO'240 teaches

the polymer web positioned adjacent an electrode structure to form a battery assembly into which is placed an electrolyte that is at least partially absorbed by the electrode structure (page 1, lines 1-7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the polymer web in combination with the electrode structure to form a battery assembly as shown in the WO'240 invention because such is intended use of the material and WO'240 provides necessary details to practice the invention of Takita.

Response to Amendment

7. The art rejections over WO'240 in view of JP '161 and Larsen have been maintained for the following reasons. Applicant argues that Larsen does not teach or suggest neither UHMWPE nor an antioxidant coating. Larsen does not need to address these issues because WO'240 teaches UHMWPE while JP'161 discloses an antioxidant coating. The examiner notes that none of working examples of Larsen mention an antioxidant material present in the amount exceeding 1.15 percent of the weight of polyethylene. However, they are merely illustrative of the Larsen invention and do not limit its scope. Larsen does disclose the antioxidant material present in the polyethylene web in an amount up to 15% by weight of polyethylene. Therefore, in view of the teachings of Larsen, one of ordinary skill in the art would have found it obvious to use an antioxidant material present in a battery separator up to 15% by weight of the polyethylene for attaining antioxidant effects. Since the claim does not specify

an antioxidant material present in the web different from the antioxidant material in the coating, the antioxidant material appearing in the antioxidant material to polyethylene ratio as set out in the claims would include the antioxidant material present in both the web and the coating. The ratio increases from 0.058 to 0.2 in light of the full disclosure of Larsen (see calculation above). Applicant was incorrect on a calculation of an antioxidant material-to-polyethylene ratio as shown in example 1 of Takita. The battery separator contains 10 parts by weight of polyethylene and 0.375 parts by weight of antioxidant, which gives an antioxidant material to polyethylene ratio of 0.0375 not 0.00375. It is evident that the battery separator could contain an antioxidant material in an amount of 1.63% and 3.75 % by weight of the polyethylene as shown in WO'240 and Takita respectfully. Therefore, the antioxidant concentration in the range from 0.01 to 1% by weight as shown in the bulletin titled "Irganox 1010, Antioxidant and Thermal Stabilizer" (1990) of Ciba-Geigy is not typical for plastic applicants as contended by Applicant.

Applicant further adds that the antioxidant concentration range is desirably lower than 1 wt% from the practical view of cost, cross-contamination issues and handling for the extrusion process. The examiner respectfully disagrees. No cross-contamination issues as well as difficulty during extrusion process have been reported in WO'240 and Takita when the antioxidant concentration was used greater than 1 wt%. Additionally, higher concentration of the antioxidant is still preferred when the demand for excellent antioxidant effect justifies the high

cost involved. The examiner notes that JP'161 limits the antioxidant content to no greater than 1 percent is completely irrelevant to the antioxidant concentration in the web.

Applicant has reiterated positions taken with respect to the rejections over Takita in view of Whear et al, JP'161 and Larsen et al, the examiner's comments set forth above are equally pertinent in the support of these rejections as well.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on (571) 272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HV

Hai Vo

HAIVO
PRIMARY EXAMINER